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SKILL IMPROVEMENT NEEDS OF AGRICULTURAL SCIENCE TEACHERS IN FISHPOND CONSTRUCTION AND STOCKING OF FINGERLINGS AS A SUPPORT BUSINESS IN EASTERN KOGI STATE, NIGERIA

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Abstract:
The purpose of this study was to determine the Skill Improvement Needs of Agricultural Science Teachers in Pond Construction and Stocking of Fingerlings as a Support Business in Eastern Kogi State, Nigeria. The study had two specific objectives, two research questions and tested two hypotheses at 0.05 level of significance. Literature was reviewed in line with the variables under study. The study adopted survey design. The population of the study was 235 from which 85 was taken through purposive sampling technique. A 26 item researcher - made questionnaire was used for data collection. It was face validated by two experts from Agricultural Education Unit of Vocational Education Department and one expert of Measurement and Evaluation. A reliability co-efficient of 0.89 was obtained using Cronbach alpha technique. The data obtained were coded and manipulated using mean and standard deviation to answer the research questions while the two hypotheses were tested using independence t-test at 0.05 level of significance and 83 degrees of freedom. The findings revealed that there was no significant difference in the mean rating of male and female agricultural science teachers on their skill improvement needs in all the skills identified in the study. Based on the findings it was recommended that the identified skills should be package into a retraining programme to enable secondary school teachers to have a support business.

Keywords: skill, improvement, pond, fingerlings, Eastern Kogi, Nigeria

1. Introduction

Fish belong to the kingdom animalia, and the phylum chordate. It is any member of a paraphytic group of organism that consists of all gill-bearing aquatic organism. Fish is believed to have 32000 species, exhibiting greater species diversity than any other group of vertebrate.

According to Helfman (2007), the various fish group account for more than 28,000 known species of which 27,000 are bony fish, with 970 sharks' rays and chimeras, about 108 are hagfish and lampreys. Peter (2007), pointed out that fish are an important resource for humans worldwide, especially as food. The author further added that commercial and subsistence fishers hunt fish in wild fisheries or farm them in ponds or in cages in oceans. The author stress out that fish has had role in culture through the ages, serving as duties, religious symbols and as subject of art.

According to Essien (2009), fish is one of the highest sources of protein. Fish is a low fat high quality protein that is filled with omega-3 fatty acids and vitamins such as D and B2 (riboflavin). According to the author, fish is also very rich in calcium and phosphorus and is equally a great source of minerals, such as iron, zinc, iodine, magnesium and potassium. The act of raising this fish is taught to students by agricultural science teachers.

Agricultural science teachers according to National Board for Technical Education (NBTE (2000), are set of teachers who are trained in the field of agriculture to affect learners with agricultural knowledge and principles. In the context of the study, agricultural science teacher is a person who have received training in knowledge, skills, attitude and pedagogy from a recognized tertiary institution and vested with the role of imparting same to learners. Fish is taught in secondary schools as fishery. Peter (2007), defined fishery as the industry or occupation devoted to the catching, processing or selling of fish, shellfish or other aquatic animal. The author further added that it is a place where fish or other aquatic animals are raised. The rearing of this fish required the use of skills.

Concisely, Okorie (2000) explained that skill is a well-established habit of performing task in a manner acceptable by workers in the profession. In the view of Osinem (2005), skills referred to the ability of a person to perform an act expertly. Continuing the author stated that, it is therefore expertness, practices ability or proficiency displayed in the performance of the task. In the context of this research work, skills are those abilities that are required by secondary school teachers to enable them carry out fishery activities as a support business. These skills are needed by secondary school teachers to be proficient in fishery. Specifically, Triner (2000) defined

needs as the gap between current and desired (or required) result that is, the results of the gap between what is and what it should be. These teachers need improvement to be able to go into full part-time fishery. Isa (2002), defined skill improvement needs as the process of strengthening and equipping them with the content, knowledge, skills, access to information, and training that will enhance their planning performances in an efficient and effective way. Contextually, skill improvement needs are those production skills required for improvement by agricultural science teachers who wish to pick up fish production as a support business. These skills are in the area of construction of fishpond, stocking of fingerling, management of fishpond, harvesting and marketing. Teachers need this fish production in order to support their income.

According to Hornby (2014), support is defined as something which often used attributively as a complement or supplement to. Ellah (2013) view support as an assistance or encouragement to person or something in order to bring about success and accomplishment. In the context of this study, a support business could be seen as any additional income generating enterprise by agricultural science teacher who is already employed to support his income based.

Statement of the problem

Many agricultural science teachers wholly depend on their salaries from Government for survival. They do not in any way make provisions for any other business to support their monthly stipends from white collar jobs. Because of this, when Government could not pay them at the end of the months or for some couple of months, they run into indebtedness and borrowing or remain in abject poverty. Therefore, the need for them to pick up a business as a support is quite necessary.

Having observed that fish farming is a major business that is profitable in the area of study and does not require much time as compared to other animal production, the researcher feels that agricultural science teachers who do not have any other support business could engaged in fish production to build up their revenue in order to improve their earning so as not to make them fully dependent on their meager salaries.

Interactions with some of the teacher revealed that they do not possess all the required skills in modern fish production. Therefore, they still need improvement to meet up with the new techniques in constructing fishpond, stocking of fingerlings, fish pond management, harvesting and marketing. It is on this premise that the researcher feels that improvement skill could be packaged into a retraining programme with the view to provide support business for this teachers hence this study on 'skill

improvement needs of agricultural science teachers in practical fish production as a support business in Eastern Kogi state, Nigeria.

Purpose of the study

The general purpose of this study was to identify the skill improvement needs of agricultural science teachers in pond construction and stocking of fingerlings as a support business in Eastern Kogi state, Nigeria. Specifically the study sought to identify the skill improvement needs of agricultural science teachers in:

1) Construction of fishpond
2) Stocking of fingerlings

Research questions

The following research questions guided the study.

1) What are the skill improvement needs of agricultural science teachers in construction of fishpond?
2) What are the skill improvement needs of agricultural science teachers in stocking of fingerlings?

Research hypotheses

The following hypotheses were tested in the study:

1) There is no significant difference in the mean ratings of male and female agricultural science teachers on their skill improvement needs in the construction of fishpond.
2) There is no significant difference in the mean ratings of male and female agricultural science teachers on their skill improvement needs in stocking of fingerlings.

Literature Review

Fish pond according to Eyo (2000) is the artificial home or habitat constructed by farmers to raise baby fish. Helfrich (2000) defined fish pond as depression for holding water for fish production. The author further added that, fish pond is a body of water enclose in a concrete or earthen pit with an inlet and outlet structure for growing fish. It can be shallow or deep with varying dimension (length, width and depth). The author continued that pond construction is the art of providing or building artificial place or habitat to raise fish. According to the author, this require some basic skills among this may include ability to select good and proper pond location, using good materials and knowing the appropriate size of the fish pond. According to Helfrich (2000), pond

construction for fish are designed and constructed for easy access, adequate volume and water level maintenance. The author added that the selection of pond site is one of the most important steps in construction. To construct a pond under a good condition, Heut (2001) said it is necessary to have enough water of good quality and that it is necessary that the topography characteristics should be satisfactory. The author stated that the dike must rest on solid and water tight ground, while the ground should be neither hilly nor too flat. According to the author, dike is a very important part of a pond as a badly made dike is almost irreparable. The author further explained that the two principal qualities of dike are solidity and water tightness. The author said that if the dike is constructed carefully, the slight oozing of water which might be noticed at first disappears little by little once the pond is filled with water and the dike becomes water tight.

The sluice and the monk are modern outlet system. According to Heut (2001), Sluice is a construction which is an integral part of the dike and is formed by two lateral and parallel walls while the monk is a construction placed in front of the dike and formed by lateral and parallel walls. The monk has two important functions, when the water is being filled; it controls the level of the water and prevents the escape of fish. When the pond is being emptied, it permits progressive drainage of the pond.

Laughin (2000), said that a pond should have an outlet where water can be let out of the pond. It should also have an overflow system used in regulating water levels in the pond especially during rainy season. The author further said it should be position at the free board level to let out excess water. According to the author, a freeboard is the distance between the water level and height of the dam. The author also stated that an inlet should be built to the pond to let in water. This should be a height above the water level in the pond (i.e about 1.lm)

In the opinion of Chackroff (2002), fish pond whether large or small, expensive or inexpensive, single backyard or large hatchery pond, they are much the same and follow the same principle of construction. The author enumerated the steps in pond construction to include surveying of land, marking out the area of the pond, measuring and marking out the walls, excavating the pond bottom if necessary, building the drainage system, water inlet and the walls and sealing the pond bottom and walls.

In the view of Ita (2011), a major pre-requisite in fish rearing is the choice of a suitable site for fish pond construction. The author said that apart from concrete pond which can be sited anywhere and can utilize water from any source; all earthen ponds must be well sited on suitable soil to guide against excess seepage of water. According to Heut (2001), all ponds must be installed with water inlet with the exception of ponds

fed by springs which have a regular supply of water, though not in excess. A well-constructed water inlet must fulfill the following conditions:

- It must assure a regular and regulated supply of water for the pond.
- It must prevent the escape of fish, especially. The possibility of their escaping into the feeding water course.
- It must keep out the undesirable fish which might come in through the water fed into the pond.

Stocking according to Essien (2009), refers to act of bringing baby fish also known as fingerlings into the fishpond for rising. This requires skills from the farmer and this may include knowing the breeds of the fingerlings require according to the size of the fishpond.

Sneed (2001), stated that the pond should be kept dry, disinfected with quicklime and insecticide with technolophone as action ingredient. The purposes of these are to eradicate unwonted aquatic weeds, fish and predatory insects. Chackroff (2002), suggested that stocking of 100-150mm long fingerlings of desired carp species is ideal for stocking grow-out ponds. In the absence of this fingerling, advanced fry or early fingerlings should be stocked in predator-free pond; this should depend primarily upon the volume of water and oxygen balance of the pond. Adigun (2007) also stated that Ph of 6.5-9 is optimum for freshwater fish as fresh water fish cannot survive in water below PH 4 and above PH 11 for long periods.

Okoye (2006) said that overstocking of fish pond results in the harvesting of many but undersized fish species at the end of the culture period, while under-stocking results in the harvesting of big size fish, but few in number. The author therefore suggested that fish farmers should strike a balance in the stocking density of their pond as well as combining fish species of complementary feeding habits. The author said fish should be stocked 4-8mm^2. The author further explained that pond should be fertilized before stocking, fertilization provides the nutrient components notably, nitrogen, phosphorous and potassium needed for rapid development of phytoplankton. They author added that inorganic fertilizer could be applied through fermentation, broadcasting or use of sac.

Chackroff (2002) explained that rearing fry to fingerling stage is carried out in rearing pond, where fry are stocked at the rate of 0.25-0.30 million per hectare with a survival level of 60-80% under conducive environment. For healthy fry rearing, it is recommended that the size of the fry at the time of stocking in the rearing pond should be as uniform as possible.

Okoye (2006), listed culture system as monoculture and poly-culture. The author further explained monoculture as the growing of one species of fish only in a pond and

polyculture as the combination of two or more species of fish in a pond. The author said that polyculture use the natural food sources in a pond better, and if mixed correctly each of the specie eat a different food from the pond and added that fish stocked in polyculture must be able to link together and should not compete with each other for food.

Another culture system in the opinion of Lovshin (2003) is monosex culture. The author explained monosex as the growing of only one sex of one species of fish in a pond, this will turn all the energy of the fish into growth rate than females and that one fish species often used in monosex culture is tilapia. Tilapia the author said produces as a very small size fish but when separated by sex, they do not develop their sex reproductive organ, yet continue to grow. The author added that one way of stocking in monosex is to separate the fish one by one according to sex.

Methodology

The design adopted for this study is survey. The study was carried out in Eastern Kogi State of Nigeria located in the nation's Middle Belt and North-central geopolitically with a study population of 235 Agricultural Science teachers of 137 males and 98 females.

The sampling technique utilized in this study was purposive sampling. The instrument used for data collection was Skills Needed in Pond Construction and Stocking of Fingerlings Questionnaire (PCSFQ) made up of two sections (Section A and B). Section 'A' was designed to collect demographic information of respondents, while section 'B' is a four point option scale of Highly Needed (HN), Needed (N), Slightly Needed (SN) and Not Needed (NN). The instrument was face validated by three experts in the fish production industry.

The reliability of the instrument was determined using split-half technique and Pearson Product Moment Correlation Coefficient Analysis using a pilot sample of 20 teachers in the study area (this number did not constitute part of the actual sample) and yielded a coefficient of 0.89 indicating that the instrument is reliable. The researcher utilized the assistance of the principals of the schools from where the teachers were selected. The principals were instructed to give the agricultural science teachers the questionnaire to respond to after which the researcher went back to collect the instruments from the principals.

Data was collected from the respondent and coded according to the scale of measurement which are *highly needed* (4 points); *needed* (3 points); *slightly needed* (2 points) and *not needed* (1 point). The decision rule is that where a skill item had a mean

score of between 1.1 and 4 indicates that the skill is needed and if a skill item has a mean score of 0.0-1.0 indicates that the skill is not needed. The data was analyzed using mean and standard deviation and the Skill Need Index (SNI). To test the research hypotheses, the independent t-test analysis was utilized.

Result and Discussion

Research question 1 and Hypothesis 1

What are the skill improvement needs of agricultural science teachers in construction of fish pond?

There is no significant difference in the mean ratings of male and female agricultural science teachers on their skill improvement needs in the construction of fishpond. The data to answer the research question and test the hypothesis are presented on Table 1.

Table 1: Means and standard deviations of skill improvement needs of agricultural science teachers in construction of fish pond

S/N	Items	$\overline{X}$	S.D	Remark
1	Select a good and proper pond location.	3.80	1.95	Needed
2	Survey the land	3.60	1.90	Needed
3	Clear the selected site	3.10	1.77	Needed
4	Dig up the pond to about 1.22 (4ft) deep	2.93	1.70	Needed
5	Collect cement, sand and gravel	2.80	1.67	Needed
6	Mixed cement, sand and gravel in the ratio of 1:2:4 respectively with water	2.80	1.67	Needed
7	Erect block walls	2.70	1.64	Needed
8	Plaster the walls to about 5cm (2ins) thickness.	3.00	1.73	Needed
9	Reinforce the four corners of the pond walls.	1.90	1.37	Needed
10	Install an overflow pipe.	1.80	1.34	Needed
11	Supply water regularly.	1.80	1.34	Needed
12	Provide electricity to pond site.	2.30	1.52	Needed
13	Construct access road to pond	3.14	1.77	Needed
14	Fence off the pond to avoid children and domestic animal from drowning.	1.40	1.18	Needed

Independent t-test analysis to determine the difference between the opinion of male and female fish farmers on the skill improvement needs in pond construction.

Variables	N	$\bar{X}$	SD	t-cal
Male fish farmers	50	48.42	6.95	
Female fish farmers	35	47.88	6.91	0.246

P>0.05; df= 83; critical t=2.021.

The data on Table 1 revealed that all the items had mean scores of between 1.4 (item 14) and 3.8 (item 1). The table revealed that agricultural science teachers needed improvement on all the skills in construction of fish pond.

The analysis above show that the calculated t-value of 0.246 was found to be less than the critical t-value of 2.021 when tested at 0.05 level of significance with 83 degree of freedom. This implies that the result is not significance therefore the null hypothesis was retained while the alternate hypothesis was rejected. The implication of this result is that agricultural science teachers need improvement in all the skills in construction of fish pond.

Research question 2 and Hypothesis 2

What are the skill improvement needs of agricultural science teachers in stocking of fingerlings?

There is no significant difference in the mean ratings of male and female agricultural science teachers on their skill improvement needs in stocking of fingerlings. The data for answering research question 2 and hypothesis 2 are presented on Table 2.

Table 2: Means and standard deviations of skill improvement needs of agricultural science teachers in stocking fingerlings in fish ponds

S/N	Items	$\bar{X}$	S.D	Remark
1	Select the breeds of fingerlings to use.	2.70	1.64	Needed
2	Keep pond dried.	3.02	1.74	Needed
3	Remove unwanted weed.	1.90	1.37	Needed
4	Balanced stocking density.	3.60	1.90	Needed
5	Fertilized pond before stocking.	3.30	1.82	Needed
6	Keep pond water level at not less than 1m.	2.20	1.49	Needed
7	Transport fingerlings to pond site	1.80	1.35	Needed
8	Keep container temperature at tolerant level of fingerlings.	1.80	1.35	Needed
9	Keep the conveyor container close to pond.	1.60	1.26	Needed
10	Make pond ready to receive fingerlings.	3.60	1.90	Needed
11	Use scoop net to remove fingerlings from the conveyor into the pond.	2.63	1.62	Needed
12	Provide adequate shade for fingerlings establishment.	1.94	1.39	Needed

Independent t-test analysis to determine the difference between the opinion of male and female fish farmers on the skill improvement needs in stocking of fingerlings.

Variables	N	$\bar{X}$	SD	t-cal
Male fish farmers	50	47.45	6.88	
Female fish farmers	35	46.82	6.84	0.290

P>0.05; df= 83; critical t=2.021

The data in table 2 above revealed that all the items had mean scores of between 1.6 (item 9) and 3.6 (item 4) which indicated that agricultural science teachers needed improvement on all the skill in stocking of fingerlings.

The analysis above show that the calculated t-value of 0.290 was found to be less than the critical t-value of 2.021 when tested at 0.05 level of significance with 83 degree of freedom. This implies that the result is not significance therefore the null hypothesis was retained while the alternate hypothesis was rejected. The implication of this result is that agricultural science teachers need improvement in all the skills in stocking of fingerlings.

Discussion of Results

Findings on research question one and hypothesis one revealed that all the identified pond construction skills were needed for improvement by agricultural science teachers. This is because all the identified skills had their mean score between 3.8 and 1.4 which were above 1.0 being the measure of needed skills. This finding is in agreement with Chackroff (2002),who reported that fish pond whether large or small, expensive or inexpensive and single backyard or large hatchery pond are much the same and follow the same principle of construction. The finding is also in line with the opinion of Ita (2011), who opined that a major pre-requisite in fish rearing is the choice of a suitable site for fish pond construction. This finding is in agreement with DFRRI in Dumbiri (2011) who outlined 9 construction skills and Chackrott (2002) with 8 construction skills needed by agricultural science teaches in practical fish production. The second research question and hypothesis revealed that all identified stocking skills had their mean score between 3.60 and 1.60. This implies that they were all needed by agricultural science teachers. These findings are in line with Essien (2009), who said that stocking is the act of bringing baby fish also known as fingerling into the fish pond for rearing. Similarly, the finding also confirms the position of Chackroff (2002) who opined that stocking is

the act of placing the fish into the pond. The result also agree with Okoye (2006) when the author said that Overstocking of fish pond results in the harvesting of many but undersized fish species at the end of the culture period, while under-stocking results in the harvesting of big size fish, but few in number. The author therefore suggested that fish farmers should strike a balance in the stocking.

Conclusion

The study was concerned with skill improvement needs of agricultural science teachers in fish pond construction and stocking of fingerlings as a support business for teachers in Eastern Kogi State. Observation have shown that many agricultural science teachers do not have requisite skills in the above areas of fish production as evidence in the answers to the research questions which indicated skills where agricultural science teachers needed improvement. In view of this fact, the researcher believe that Agricultural Science teachers could be successful if this identified skills where they need improvement could be package and used to retrain the teachers for the desired improvement with the view to making them successful in practical fish production as a support business.

Recommendation

Based on the findings, it was recommended that:

1) This skills identified should be packaged into a retraining programme for Agricultural science teachers to encourage them to become interested in fish farming enterprise.
2) Information provided by this study should be used by teachers in teaching their students so that they too may be equipped with sufficient knowledge and skills on pond construction and stocking of fingerlings which will help them establish on their own after graduation.

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